

use in irrigation systems and may be injected into the system to kill bacteria, algae, and fungi that may be present in the water. The level of the injected compound must be closely monitored as high levels may cause plant damage. All chemicals should be used according to the label.

Additional information concerning water quality problems and potential solutions can be found in the publication "Causes and Prevention of Emitter Plugging in Micro Irrigation Systems" (Institute of Food and Agricultural Sciences Bulletin 258, Florida Cooperative Extension Service, April 1990).

## Types of systems

### Drip tube systems

Drip tube irrigation systems utilize 1 to 2 mm (0.04 to 0.08 inch) inside-diameter tubing to supply water directly to individual pots (Figure 1). The tubing used for these systems is generally referred to as spaghetti tubing. Spaghetti tubing is inserted into 1.3 to 1.9 cm (0.5 to 0.75 inch) polyethylene pipe which serves as the supply line for each bench. The free end of the tubing is then held in the container by a weighted emitter or with the use of a small stake. Other systems may use multiple outlet drippers with several supply tubes attached to each outlet or individual pot drippers on the end of each supply tube (Figure 2). The spaghetti tubing

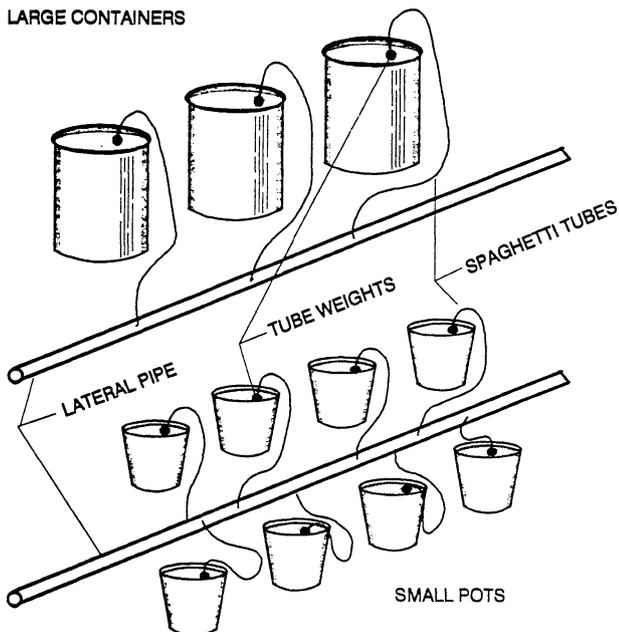


Figure 1. Spaghetti tube irrigation system with individual spaghetti tubes per pot.

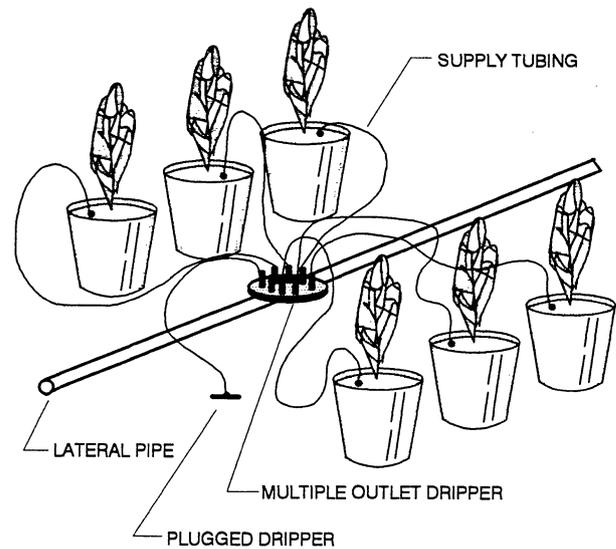


Figure 2. Spaghetti tube irrigation system with multiple dripper outlets.

can be purchased pre-cut to specific lengths or cut to the desired length from a roll of tubing. The length of the spaghetti tubing and the pressure of the water supply control the application rate from each tube. Dishes or trays may be placed under the pots to catch any irrigation water that might leach through the soil. This not only prevents runoff, but the retained water may be taken back into the soil by capillary action and used by the plant.

Irrigation scheduling is easily automated with the use of electric solenoid or hydraulic control valves connected to simple clocks or irrigation computers. Multiple daily applications of water are often used to maintain adequate moisture levels in the growing medium. Sufficient water should be applied to uniformly wet the growing medium but not enough to result in leaching. Since water drips or trickles from emitters or tubing at one area within the container, a uniformly mixed growing medium which allows capillary movement of water and fertilizer is necessary. If the growing medium is too porous, water and fertilizer movement may be limited to one side of the container leaving part of the growing medium dry. Emitters have been designed that provide a broader pattern of water distribution to the medium surface and thus a more even distribution of water to the pot.

Soluble fertilizers injected into the irrigation water are often used with drip tube systems. Attention to the solubility of nutrients or associated ions and reaction with existing elements in the irrigation water is necessary to prevent clogging of tubing and emitters. Controlled-release fertilizers may also be used with this system alone